This text seems to be an improvement over the author's earlier edition, both in attractiveness of the printed page and abundance of well-selected original exercises. After all the pupil's ability to solve original theorems is the real test of geometrical knowledge.

The text as a whole seems to meet very well the recent demands for the subject.

North High School,
Minneapolis.

F. W. Gates.

PROBLEMS AND SOLUTIONS.

Edited by B. F. Finkel and R. P. Baker.

PROBLEMS FOR SOLUTION.

ALGEBRA.

441. Proposed by W. D. CAIRNS, Oberlin College.

Prove that the equation $(e - 1)x = e^x - 1$ has two and only two real roots. [Adapted from *L'Intermédiaire*.]

442. Proposed by CLIFFORD N. MILLS, Brookings, North Dakota.

Show that the sum of n terms of the series $1/2 - 1/3 + 1/4 - 1/6 + 1/8 - 1/12 + \cdots$ is $1/3[1 - (1/2)^{n/2}]$ when n is even, and $1/3[1 + 2\sqrt{2}(1/2)^{(n/2)+1}]$ when n is odd.

GEOMETRY.

472. Proposed by PAUL CAPRON, U. S. Naval Academy.

The sides of a spherical triangle are a, b, c; the corresponding opposite angles are A, B, C; p and P are the polar distances of the inscribed and circumscribed circles; $a + b + c = 2s$; $A + B + C = 2S$. From a geometric figure, by the formula for solving right spherical triangles, show that

$$\tan^2 p = \operatorname{cosec} s \sin(s - a) \sin(s - b) \sin(s - c); \tag{1}$$

$$\cot^2 P = -\sec S \cos(S - A) \cos(S - B) \cos(S - C). \tag{2}$$

Thus establish the usual formulas for the tangent of the half-sides and half-angles.

Also show that

$$\frac{\text{sine of angle}}{\text{sine of the opposite side}} = \frac{\cot P \cos S}{\tan p \sin s}. \tag{3}$$

473. Proposed by FRANK R. MORRIS, Gendale, Calif.

What is the length of the longest rectangle an inch wide that can be placed inside another rectangle 12 inches long and 8 inches wide. Obtain the result correct to the third decimal.

CALCULUS.

393. Proposed by LAENAS G. WELD, Pullman, Ill.

Find the area of the least ellipse which can be drawn upon the face of a brick wall so as to inclose four bricks.

394. Proposed by W. W. BURTON, Macon, Ga.

A horse runs 10 miles per hour on a circular race-track in the center of which is an arc-light. How fast will his shadow move along a straight board fence (tangent to the track at the starting point) when he has completed one eighth of the circuit?